

# Fourier-Transform Infrared Spectroscopy with Attenuated Total Reflectance Attachment (FTIR-ATR)



Contaminated weld

## The Problem

Ultrasonically welded plastic parts can fail due to surface contamination. Because impurities and foreign matter are often visually undetectable, these failures seem random, but they are not. Contamination on a polymer's surface can result in more voids and lower-strength joints. To prevent weld issues, materials should be properly characterized in advance of welding.

## The Process

*Fourier-transform infrared spectroscopy with an attenuated total reflectance attachment* (FTIR-ATR) can identify contamination on the faying surface of a plastic part. FTIR-ATR assessment, a nondestructive process, is performed by putting the surface of the component in contact with the ATR diamond and measuring the light absorption into the material over a range of wavelengths. Larger parts that are too big to fit into the instrument can be cut to fit. Once the scan is complete, the distinctive absorption peaks are noted, and spectral matches are used to identify the type of plastic for the base material and any surface contamination. This relatively quick process provides a molecular-level understanding of contaminants on the surface at the weld.

## The Benefits

- **Improve first-time quality** – conducting an FTIR-ATR assessment before joining plastic parts prevents weld failure due to contaminants on or in the surface of a plastic
- **Save time** – prescreening material helps avoid the need for failure analysis and rework
- **Save material** – early evaluation can determine if the material can be cleaned or must be replaced
- **Rule out other possible defects** – detecting surface contamination can help identify the root cause of an unexpected welding failures

To learn more about FTIR-ATR, contact Jeff Ellis, Senior Technology Leader, at [jellis@ewi.org](mailto:jellis@ewi.org) or 614.688.5114.

## The EWI Advantage

With full spectroscopic capabilities, EWI offers FTIR-ATR assessments to fabricators in advance of part production to ensure the quality and fitness of selected polymers and to provide clients with greater confidence in their material choices and suppliers. The tool can also be applied post-production to conduct failure analysis at the microscopic level.

If you have issues with plastic weld failure or want to assure quality your materials before production, EWI can help. Contact us today!



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